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Original Communication

Homicides against infants, children and adolescents in Budapest (1960–2005)

Klára Törő MD, PhD *, Szilvia Fehér MD, Katalin Farkas MD, György Dunay MD

Department of Forensic and Insurance Medicine, Semmelweis University, 1091-Hungary, Budapest Üllői út 93, Hungary

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ABSTRACT

Introduction: The objective of this study was to determine the characteristics and trends of fatal child abuse that would assist family doctors in detecting signs of maltreatment.
Subjects: There were 363 (193 males, 170 females) such cases autopsied at the Department of Forensic and Insurance Medicine at Budapest from 1960 to 2005. Information was collected from forensic autopsy records. Data were analyzed according to age, gender, type of abuse, injured body region, and seasonal distribution. The firs detection of fatal injuries and death certification were usually done by GPs or ambulance at the scene of the homicide or hospital paediatricians in cases with survival period between the injuries and death.
Results: Our results suggest a definitive decrease in fatal child abuse cases during the investigated period. In the first part of study period suffocation of infants represent a great number of cases. Infanticide rapidly dropped after the mid 1970s. In this material 89.3% of fatal cases was detected and reported by family doctors.
Conclusions: Rate of homicides against infants, children and adolescents reflect the effectiveness of the preventative strategies, the child protection policy and the unique primary health care system for youth. GPs have an important role in the investigation of infanticides and homicide cases against children and adolescents.

1. Introduction

The decreasing number of the population and decreasing births rate in Hungary has created a growing social and public interest in every violent child death. The death of a child has a sentinel event in a community, and a defining marker of a society's policies of safety and health.[1] Rate of homicides against children and adolescents reflects the effectiveness of the preventative strategies and the child protection policy.

In Hungary a specific and unique system was introduced in 1975 to provide a careful primary health care for children and adolescents between the age of 0 and 18 years. In general practices there was a separation between patients under the age of 18 years and older people. In general practices for children and adolescents the general practitioners have to have a specialisation in paediatrics since 1975, and in this way a very unique system with high quality of primary health care was provided for patients younger then 18 years. The primary care for infants, children and adolescents has been provided by professional paediatricians. GPs in practices for patients under 18 year have the duty of the care of children and adolescents, and they have not treated older patients or adults. The professional knowledge and experience at the field of paediatrics of GPs with patients younger than 18 year represent a great support and improvement in primary care of children and adolescents.

GPs are likely to be the first point of contact for children with health problems,[2,3] and are well placed to detect early signs of non-fatal abuse; however, certification of death in homicidal cases needs special attention and knowledge of external signs. Homicide cases involve a difficult and sensitive final diagnosis and need a careful post mortem medico-legal investigation. In many fatal cases GPs are the first professionals, who detect the signs of homicide at the scene.

Child abuse is one of the major and unrecognised problems affecting the well-being and impairing the harmonic development of children and adolescents. The World Health Organization estimates 57,000 children die yearly from fatal maltreatment,[4] the rate is about 0.1–12.7 deaths per 100,000 children. In Hungary the fatal rate is 0.55 per 100,000 inhabitants in the year of 2005. Fatal non-accidental injuries have been published in clinical studies[5–7] and post mortem investigations.[8–10]

Several social and psychological[10–15] risk factors were studied to detect the most important effects of child abuse, the post mortem

* Corresponding author.
E-mail address: torok@igaz.sote.hu (K. Törő).

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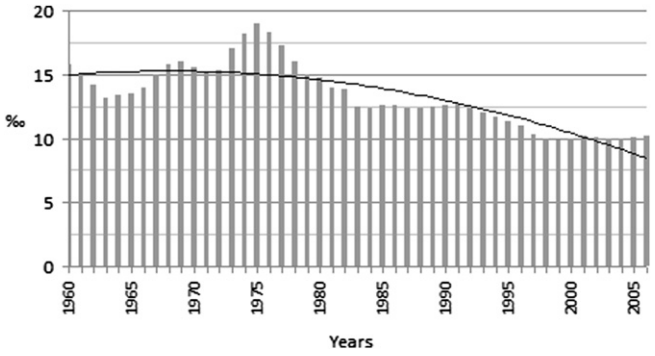

Fig. 1. Alive birth rate of Hungary (1960–2005).

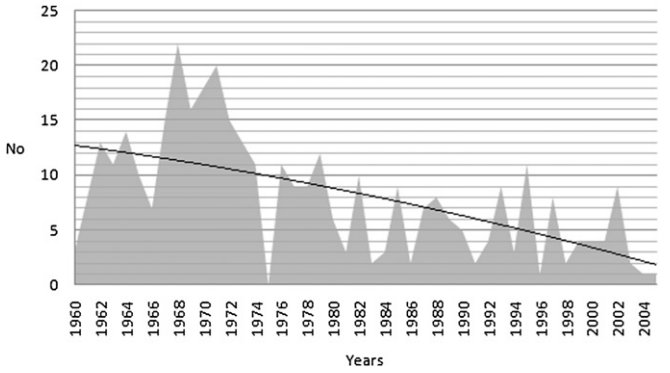

Fig. 2. Homicide cases among infants, children and adolescents in capital Budapest (1960–2005).

findings, and types of homicides against children. Fatal child abuse has traditionally been in a close connection with parental behaviour, domestic violence, education and unemployment rate of parents, low socio-economic status.[14,13] Recent year's violence and criminality between children,[16] drug abuse[17,18] have been reported as additional risks.

There are several forms of homicides in childhood, as infanticide, neonaticide, fatal child abuse, fatal bullying.[19,16] Physical abuse with blunt trauma and suffocation are the most frequent types of murders. There are several injuries on abused child victims; however head trauma is the most common cause of homicides among children.[20,21]

In this study our purpose was to determine characteristics and trends of homicides against infants, children and adolescents in a 45 year long perspective in capital Budapest, that would assist family doctors, and to examine the reasons for decline of child death, and to assist GPs in identifying signs of lethal maltreatment cases.

2. Material and methods

The survey target groups included infants, children and adolescent homicide victims. There were 363 (193 males, 170 females) such cases autopsied at the Department of Forensic and Insurance Medicine from 1960 to 2005. Information was collected from the results of scene investigation and forensic autopsy records. Data were analyzed according to age, gender, type of abuse, injured body region, seasonal distribution. The firs detection of fatal injuries and death certification were usually done by GPs or ambulance at the scene of the homicide, or were done by hospital paediatricians in cases with survival period between the injuries and death. In this study we included all the homicide cases under the age of 18 year, who were killed by caretakers, same-age peers or any other strange perpetrators.

In every case scene investigation was done by the police, medico-legal autopsy was performed by two forensic pathologists. Histology and toxicology were made in every case. DNA test and microbiology were performed in the last 10 years of study period. Blood alcohol concentrations (BACs) were used only, if death occurred on the same day as the injury. Influence of alcohol was categorized as slight degree (BAC: 51–80 mg/100 ml), mild degree (BAC: 81–150 mg/100 ml), moderate (BAC: 151–250 mg/100 ml), severe (BAC: 251–350 mg/100 ml) and very severe (BAC: above 351 mg/100 ml).

Death cases were coded by International Classification of Diseases (ICD). Assaults included homicides and injuries inflicted by another person with intent to injury or kill (ICD X85-Y09). Data include deaths in each year, using the 9th and 10th revisions of the (ICD). The ICD 9th version was used in Hungary between years of 1978 and 1995, and the ICD 10th version with detailed codes was introduced after 1995. Cases before 1978 were classified retrospectively according to the categories suggested by the later introduced ICD.

The risk of fatal injuries in different body regions was estimated statistically by odds ratio (OR) with 95% confidence interval (CI) by a conditional logistic regression.

3. Results

Alive births rate of Hungary is demonstrated in Fig. 1. The rate was 15–18 per thousand of population in the middle 60s and 70s, and decreased (about 10 per thousand populations) in this decade. Homicide cases among victims under 18 years demonstrate a decreasing tendency in the study period (Fig. 2). In this study there were all together 363 (193 males, 170 females) homicide cases between the age of 0 and 18 years. The rate of homicides among all children death cases autopsied medico-legally was about 4.8% (363 homicidal cases/7521 children death).

Homicidal methods are presented in Table 1. We found that suffocation (OR = 6.73, CI = 4.08–11.16, $p < 0.05$) and negligence (OR = 11.1, CI = 2.48–69.22, $p < 0.05$) were significantly higher among infants then in older age groups. Other types of murder, as sharp injuries, fire, gunshot, push from height were less frequent methods to kill infants, children and adolescents.

Fig. 3 demonstrates gender differences in different age groups. Among infants there were more female, however, in older age groups the number of male victims were higher. Fig. 4 shows the homicidal rates in different age groups. In the first part of study period there was a high frequency of infanticide, however, the rate was dropped after the mid 1970s. Distribution of the injured organs suggests that skull fractures and intracranial injuries were the more

Table 1
Homicidal methods in different age groups.

	0–1 year	2–5 years	6–15 years	16–20 years	All
	No (%)	No (%)	No (%)	No (%)	No (100%)
Suffocation	123 (78.4)*	17 (10.8)	9 (5.7)	8 (5.1)	157
Blunt trauma	27 (46.6)	14 (24.1)	7 (12.1)	10 (17.1)	58
Sharp injury	10 (23.3)	4 (9.3)	7 (16.3)	22 (51.1)	43
Fire	2 (7.4)	15 (55.6)	10 (37.0)	–	27
Negligence	23 (92.0)*	1 (4)	1 (4)	–	25
Push from height	6 (35.3)	7 (41.1)	2 (11.8)	2 (11.8)	17
Toxic agent	2 (14.3)	8 (57.1)	4 (28.6)	–	14
Gunshot	–	2 (16.7)	2 (16.7)	8 (66.6)	12
Other	2 (20.0)	4 (40.0)	3 (30.0)	1 (10.0)	10
All	195 (53.7)	72 (19.8)	45 (12.4)	51 (14.1)	363

*$p < 0.05$.

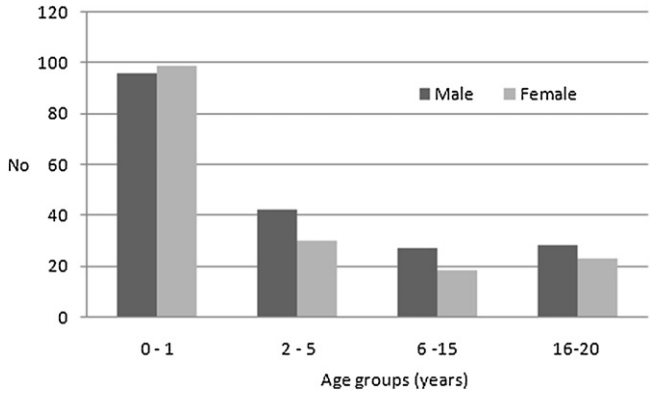

Fig. 3. Gender differences among homicides.

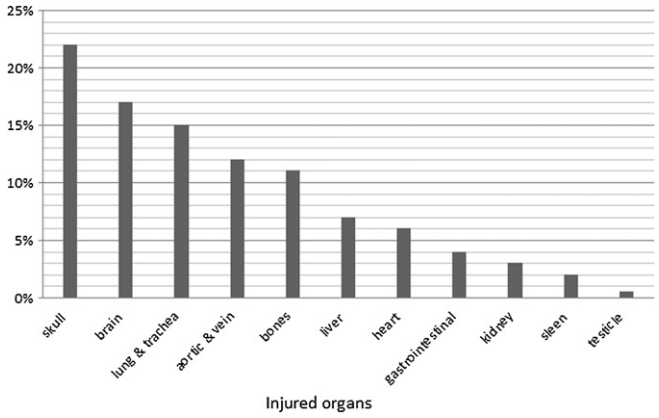

Fig. 5. Injured organs in homicide victims.

common damages (Fig. 5). In the investigated cases seasonal distribution did not demonstrate any significant difference (Fig. 6).

Table 2 demonstrates the distribution of first detection in fatal cases made by GPs, ambulance and hospital doctors. 89.3% of fatal cases were detected at the scene by GPs who were most frequently the first professionals to become aware of abuse or murder.

We found that the perpetrators were the mother in 50.7%, father in 9.7%, other males 7.6%, and grandparents in 1.3%, other female 0.4%, relatives 3.2%, and unknown in 27.1%. There were 4 (1%) cases when teenagers were killed by other same-age peers. Among victims BAC test showed in 7 cases slight degree, in 4 cases mild degree, in 3 cases moderate degree and in 2 cases severe degree.

4. Discussion

In this study we presented the findings of post mortem investigations in homicide cases against infants, children and adolescents regarding to a 45 long year period. Our results suggest a definitive decrease in fatal child abuse cases during the investigated period. In the first part of study period suffocation of infants represents a great number of cases. Infanticide rapidly dropped after the mid 1970s. Epidemiological studies examine risk factors and potential incidence[5–7,11–13,22] of child abuse or non-fatal injuries, however, the number of studies[15,10] dealing with pathomorphological changes in homicides against children is much less.

Most of the victims in our material were infants or neonates. Perpetrators were mostly mothers. Post partum psychotic events, segregation of single young mothers provide the main risk factors for infanticide. Studies of perpetrators of neonaticide have identified common characteristics in the women.[23,24] We found that the rate of mothers was 50.7%. In the age group of adolescents perpetrators are parents or relatives, however, violence between classmates or friends may occur.[16] In this age group the home of victim, school, and other public places were determined as scene of death.

In this study GPs determined death in 89.3% of cases. The most important role of GPs is to prevent child abuse, to provide treatment for families, however, in fatal cases the recognition of external injuries and the anamnestic data need special attention and a careful examination. Evaluation risk factors, damages or injuries of children provide a great help for the further authority investigation. In the Hungarian health system the GPs have the duty to determine the connection between fatal outcome and abuse at the scene that supposes knowledge of post mortem changes and injury patterns and pathomechanism. There are small changes on the body surface, as fingerprints on the neck after suffocation, or severe damages like fatal sharp injury, that could cause fatal results.

In the investigated cases homicidal manner of death was identified after the scene investigations, medico-legal autopsy and laboratory tests. Violence against children results a wide range of fatal cases. We found that the most frequent types of abuse were strangulation of carotid vessels, and cause of death was suffocation. During autopsies characteristic pathomorphological changes of strangulation were detected, as external bruises on the neck caused by fingers or other material, subconjunctival petechial haemorrhages and petechiae on thymus, lung or heart.

Severe blunt trauma may cause bruises, fractures, ruptures of internal, organs and life-threatening bleeding in the group of physical abuse cases. The most important fatal injuries can be

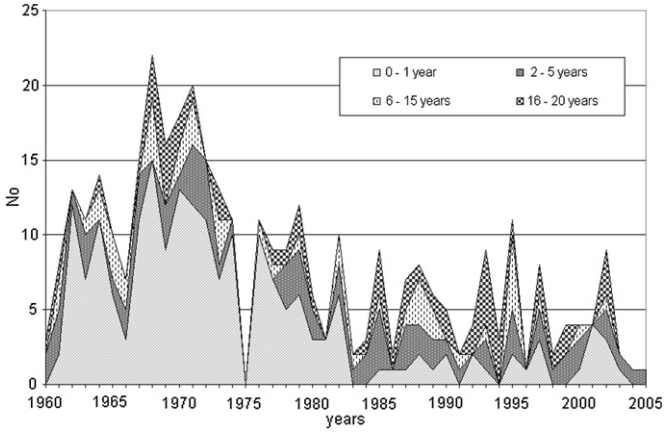

Fig. 4. Homicide rates in different age groups (1960–2005).

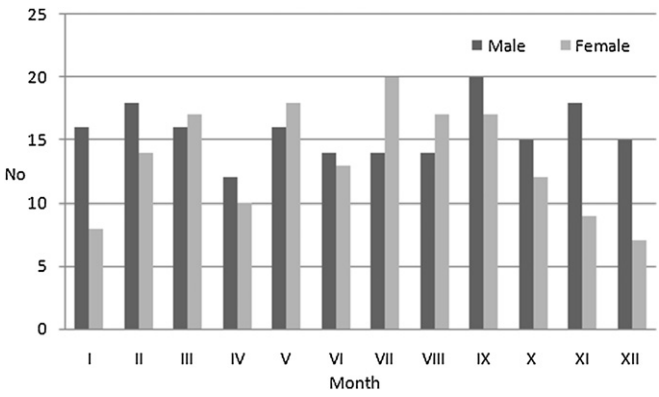

Fig. 6. Seasonal distribution among young victims who were killed.

Table 2
Medical doctors who detected homicides.

Death certification	No	%
GPs	324	89.3
Ambulance	12	3.3
Hospital doctors	27	7.4
All	363	100

detected in connection with head trauma.[1,10,20] Making the diagnosis of abusive head trauma is often difficult. A child may present with no external evidence of trauma, particularly if the abusive event did not involve impact. Non-accidental head injury leading to massive intracranial trauma has been identified as a leading cause of death in small children. Nooraudah[25] shows that death due to intracranial trauma caused by shaking with or without direct impact is the most frequent cause of mortality in abused children.

There are various signs and symptoms of shaken baby syndrome (SBS). The consequences of less severe cases may not be brought to the attention of medical professionals and may never be diagnosed. In most severe cases, which usually result in death or severe neurological consequences, the child usually becomes immediately unconscious and suffers rapidly escalating, life-threatening central nervous system dysfunction.[26] Jenny et al[27] recommend the following suggestions to physicians to facilitate the diagnosis of abusive head trauma: 1) be alert for the presence of bruises or abrasions on the faces or heads of children presenting non-specific symptoms, 2) when evaluating infants and toddlers with non-specific symptoms, such as vomiting, fever, or irritability, consider head trauma in the differential diagnosis, 3) perform a head-to-toe physical examination, check the fontanel's (soft spots) on the babies heads, measure the head size and be alert for signs of trauma.

Negligence involves a wide range of circumstances, including starvation, neglecting to provide potentially life-saving medical care, providing inappropriate supervision of dangerous activities, and allowing a child to die from exposure to heat, cold, or inadequately safeguarded poisons.[19] Negligence of newborns, infants and young children was detected as type of abuse in 25 cases. Cause of death mostly was exsiccosis, cooling in a direct connection with maltreatment or lack of treatment. In our material we excluded cases when unintentional fire or CO intoxication caused death in children who were left alone, however, these accidents are indirectly in connection with parental negligence.

Differentiation between fatal accidental and non-accidental injuries needs a careful forensic post mortem investigation and multidisciplinary cooperation. In children superficial bruises, soft tissue damages, fractures are common accidental injuries. In fatal cases evaluation of anamnestic data and pathomorphological findings detected by forensic autopsies could result the final decision about accidental or homicidal manner of death. In non-fatal cases a legal medical expert may join the team bringing his or her specific experience on lesions from the perspective of criminological interpretation, thereby giving a substantial contribution for an objective evaluation of available evidence.[28]

In Hungary GPs in general practices for infants, children and adolescents have the duty to visit the home of the newborn in less than 24 h after the mother and newborn left the maternity hospital or the newborn was born at home. Anyway GP visits the home of the patients in case of every call. They are called to the home of patients to made medical help or to certificate death. In this way GPs are most frequently the first professionals to become aware of homicide. In case of fatal non-accidental injury which was detected at the scene, the GP's duty is to inform the police. Good communication between professionals and agencies is vital.[2] Training and professional support for family practitioners about injury patterns and post mortem changes are needed to develop evidence-based practice. The ascertainment of a child's death as due to maltreatment takes careful, objective assessment by multiple professionals.[19]

Collaboration between paediatricians, general practitioners, forensic pathologists, law enforcement officers and judiciary will assure the rights of children and families are respected and justice is served. A caregiver may fail to recognize or respond to a child's medical needs for a variety of reasons. An effective response by a health care professional to medical neglect requires a comprehensive assessment of the child's needs, the parents' resources, and the parents' efforts to provide for the needs of the child, and options for ensuring optimal health for the child.

The improvements of child health care system, the effective prevention, the legislation, the cooperation between child protection organizations might have had an important role in the decreasing incidence of fatal child abuse. The Hungarian system of child protection was dramatically reformed with the adoption of Act No XXXI of 1997 on the Protection of Children and Guardianship Administration (hereafter "Child Protection Act"). Section 3 of the Child Protection Act outlines the system for the protection of children, which, according "to promote the upbringing of the child within a family, prevent and eliminate the endangerment of the child, and ensure the substitute protection of a child leaving care of parents or other relatives."

Medico-legal post mortem investigation and detailed forensic autopsy have an important role to characterise types of fatal child abuse, to distinguish between accidental and non-accidental injuries, and to define cause of death and pathomechanism of fatal injuries.

Conflict of interest

All authors have made a significant contribution to the findings and methods in the paper.

All authors have read and approved the final draft. There is no financial or commercial interest. The work has not already been published and has not been submitted simultaneously to any other journal.

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Ethical approval

None declared.

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